Center Independent Research & Development: GSFC IRAD

Micro-Sample Extraction System for In-Situ Missions to Planets, Planetary Satellites, and Primitive Bodies

Completed Technology Project (2014 - 2015)

Project Introduction

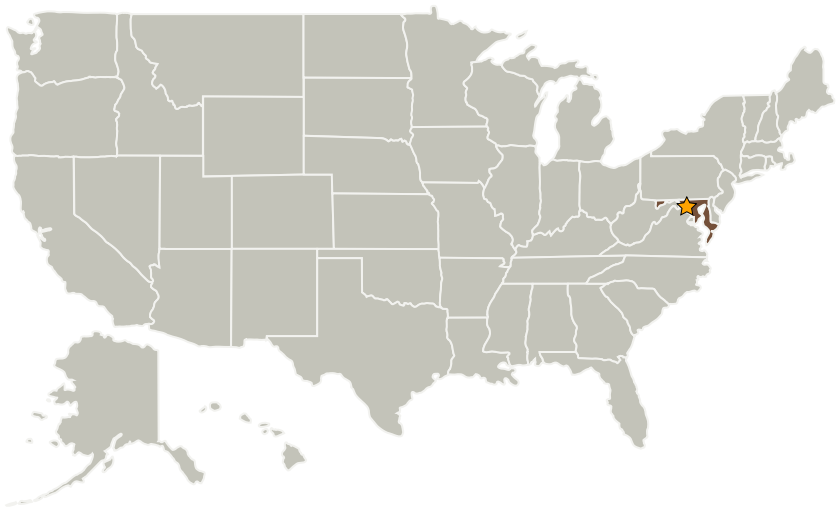
We propose to develop a proof-of-concept **Micro-Sample Extraction System** (**μSES)** to enable microfluidic instruments, currently under development at NASA Goddard Space Flight Center, by miniaturization of up-stream components of micro-analytical instruments for in situ missions to primitive bodies and planetary satellites. **μSES** will be a lab-on-a-chip component.

The proposed **μSES** on-a-chip is a similar extraction system to that found on Sample Analysis at Mars's (SAM) Sample Manipulation System (SMS). However, **μSES** will be different in that it will also be able to extract from liquids. The other capability will be the ability to conduct pyrolysis at a power consumption much less than current techniques. The low power consumption of the micro-chip will enable in-situ exploration of planetary satellites and primitive bodies at a lower cost due to less mass and power requirement. Most importantly, **μSES** will be able to couple with other microfluidic analytical chips.

Anticipated Benefits

Miniaturization of analytical instruments will enable low-resource analytical instruments for Discovery and New Frontiers missions to distant targets such as the Jovian system, Saturn moons, and primitive bodies.

Primary U.S. Work Locations and Key Partners



uSES

Table of Contents

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations
Maryland

Images

uSES
uSES
(https://techport.nasa.gov/image/16263)

Links

GSC-17054-1
(https://ntts.arc.nasa.gov/app/)

Project Website:

http://sciences.gsfc.nasa.gov/sed/

Organizational Responsibility

Responsible Mission Directorate:
Mission Support Directorate (MSD)

Lead Center / Facility:
Goddard Space Flight Center (GSFC)

Responsible Program:
Center Independent Research & Development: GSFC IRAD

Project Management

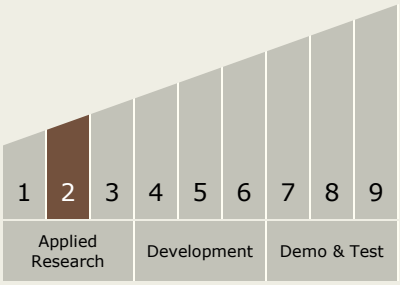
Program Manager:
Peter M Hughes

Project Manager:
Terence A Doiron

Principal Investigator:
Manuel A Balvin

Technology Maturity (TRL)

Estimated End: **2**



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Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.3 Manipulation
    - TX04.3.4 Sample Acquisition and Handling